

1 INTERACTIVE FOODSTUFF HOLDING DEVICE

2 This application claims benefit under 35 USC 119(e) of Prov. Applic. 60/097,421  
3 filed August 20, 1998  
4 Field of the Invention

5 This invention is directed to children's toys and, in  
6 particular, to an interactive foodstuff holding device that  
7 produces actions based upon real-time physical characteristics  
8 of a secured foodstuff item.

9 Background of the Invention

10 A great number of novel food items and in particular,  
11 candies are known. Recently, several devices have been created  
12 which incorporate a sound, light or motion generating means  
13 with a candy product. Some of these devices are simply  
14 electric motor systems which spin a lollipop in the user's  
15 mouth. Others, use the inherent light transmitting properties  
16 of some candies to create an illuminated, edible element.  
17 Light sources used have included electric lamps and  
18 chemiluminescent lighting elements. Still other novel food  
19 items include battery powered, motor operated dispensers or  
20 candy holders with electronic sound generating means which  
21 produce music or a rhythmic sound when a conventional, manual  
22 electric switch is operated. U.S. Patent Nos. 4,383,386;  
23 5,209,692; 5,391,107; and 5,471,373 disclose examples of these  
24 devices.

1     Summary of the Invention

2             The instant invention teaches of a new and highly  
3     interesting system which can be used with a wide variety of  
4     foodstuffs (both nutritive and non-nutritive) and which relies  
5     on controlling, optical, electrical or other physical  
6     conditions which may be operatively coupled with the foodstuff  
7     to control an action generating means. Such action may include  
8     but is not limited to any of the following activities: sound  
9     generation; lighting generation; and motion generation, such as  
10    rotation, translation or vibration.

11            Thus it is an objective of the instant invention to  
12    provide an interactive foodstuff holding device that produces  
13    action based upon real-time interaction with physical  
14    characteristics of a secured foodstuff item.

15            Other objects and advantages of this invention will become  
16    apparent from the following description taken in conjunction  
17    with the accompanying drawings wherein are set forth, by way of  
18    illustration and example, certain embodiments of this  
19    invention. The drawings constitute a part of this  
20    specification and include exemplary embodiments of the instant  
21    invention and illustrate various objects and features thereof.

22  
23     Brief Description of the Drawing

1        Figure 1 illustrates the operation and shows electrical  
2        current path of one embodiment of the instant invention;

3        Figure 2 is a detail drawing of one embodiment of the  
4        instant invention;

5        Figures 3-6 illustrate some possible configurations of  
6        sound control using one embodiment of the instant invention;

7        Figure 7 details an electrically conductive, edible figure  
8        and foodstuff holder;

9        Figure 8 illustrates the use of foodstuffs of differing  
10       conductivities to create a non-linear electrical circuit;

11       Figure 9 illustrates the use of foodstuffs of differing  
12       conductivities to create a potentiometer;

13       Figure 10 shows how a "harmonica" may be constructed with  
14       electrically conductive foodstuffs;

15       Figure 11 illustrates the concept of using individual  
16       edible elements to trigger discrete action means;

17       Figure 12 shows how conductive foodstuffs with an  
18       irregular surface may be used to create a rapid make-and-break  
19       signal;

20       Figure 13 details the design of a foodstuff holder in  
21       which the musical pitch of an oscillator is determined by  
22       controlling light levels;

1 Figure 14 is a schematic diagram of a light controlled  
2 oscillator;

3 Figure 15 is a schematic diagram of a light controlled  
4 oscillator which frequency may be manually adjusted;

5 Figure 16 is a schematic diagram of a light controlled  
6 oscillator which frequency is a step function of the light  
7 input level and is adjusted to a Western musical scale; and

8 Table 1 shows measured resistance values for selected  
9 edible foodstuffs.

#### 10 11 Detailed Description of the Preferred Embodiment

12 It is to be understood that while a certain form of the  
13 invention is illustrated, it is not to be limited to the  
14 specific form or arrangement of parts herein described and  
15 shown. It will be apparent to those skilled in the art that  
16 various changes may be made without departing from the scope of  
17 the invention and the invention is not to be considered limited  
18 to what is shown in the drawings and described in the  
19 specification.

20 Now with general reference to the drawings and, in  
21 particular to Figure 1, the variable output foodstuff holding  
22 toy device 100 of the present invention is shown. Action  
23 within the holder 100 is triggered and/or controlled by a

1 portion of the user's body 102,104 that comes in contact with  
2 or in close proximity to the edible foodstuff 101 by the user's  
3 tongue, mouth, body or other object.

4 It is noted that the terms "resistance" and "conductivity"  
5 as applied to electrical circuits are understood to be  
6 reciprocal values of one another but for the purposes of this  
7 text will be used interchangeably since changes either in  
8 resistance or conductivity will produce the desired effects of  
9 the instant invention.

10 In one embodiment, an electrical circuit 103 is  
11 constructed, in which a minute electric current passes from an  
12 electrically conductive foodstuff 101 through a holder 100, to  
13 the user's hand and arm 104 and up to the user's mouth or  
14 tongue 102, whereby the circuit is completed when the mouth,  
15 tongue or other body member comes in contact with the  
16 foodstuff. A voltage controlled oscillator, or otherwise  
17 operable sound or action generating means 132 is employed in  
18 holder 100. Holder 100 also serves to support edible foodstuff  
19 101. Holder 100 may be at least partially electrically  
20 conductive or have a label 105 which is at least partially  
21 conductive to aid in completing electric circuit path 103 from  
22 holder 100 to user's hand and arm 104. When edible foodstuff  
23 101 is touched to tongue 102, the electric circuit path 103 is

1 completed and any desired action generating means 132 may be  
2 triggered.

3 Referring now to Figure 2, one embodiment of the instant  
4 invention comprises of holder 100 with label 105 and edible  
5 foodstuff 101. A protective cover 106 may be employed to  
6 protect edible foodstuff 101 during shipping and periods of  
7 disuse.

8 The holder 100 may also be constructed to provide the same  
9 operational features while being controlled by variations in  
10 the electrical capacitance created by the position of the food  
11 stuff 101 in relation to the holder 100 and the user's mouth or  
12 other body member 102, 104. This version of the instant  
13 invention does not require that the foodstuff 101 be conductive  
14 but instead that it exhibit dielectric properties so that a  
15 capacitive element may be formed between the user's mouth or  
16 tongue 102, for example, and the foodstuff holder 100.  
17 Voltages and currents are necessarily kept low to prevent  
18 injury or even the perception of injury to the user. Indeed,  
19 circuits developed for the instant invention rely on currents  
20 in the range of 100 nano-amps which are undetectable to the  
21 user. A circuit in which changes in capacitance are employed  
22 to control action generating means 132 may be of the direct  
23 current, alternating current or radio frequency type.

1           The preferred embodiment of the instant invention relies  
2   on controlling the level of light which may be transmitted  
3   through or proximal to a portion of a lollipop 301. A photo  
4   sensor 308 and electronics 304, convert said light level to an  
5   action such as the generation of a musical note. The level of  
6   light passing through or proximal to the foodstuff may be  
7   controlled by the relative position of the foodstuff to the  
8   user's mouth or tongue 102, hand or other body element 104, or  
9   object, thereby resulting in action of the device 300 which is  
10  responsive to the motion or position of the user.

11           Yet another means of achieving the desired interactive  
12  relationship between the user and the device of the instant  
13  invention is to employ electromagnetic fields and/or radio  
14  waves. Said fields or waves being interrupted, absorbed,  
15  reflected or otherwise altered by the position of the user or  
16  user's extremities or other objects relative to the instant  
17  invention.

18           The device output may be altered in response to variations  
19  within the included electrically conductive path 103. When  
20  current and/or capacitance in the heretofore described circuit  
21  103 exceeds a predetermined threshold, an electronic circuit is

1 energized or otherwise controlled which may produce any  
2 combination of the following effects:

3

4 1. A single audio frequency tone is generated as long as  
5 the electric circuit path 103 is completed (contact of edible  
6 foodstuff 101 with tongue or mouth 102 while holding holder 100  
7 in one's hand 104 completes the circuit.) Figure 3 is a block  
8 diagram showing how a tone generator or tone sequence generator  
9 132 may be triggered by completing the electrical circuit  
10 between the sense terminals. In this case the sense terminals  
11 are the user's tongue 102 and edible foodstuff 101.

12

13 2. An audio frequency tone which frequency is  
14 proportional to current or capacitance in the circuit is  
15 generated. Changing contact position of the tongue 102  
16 relative to the edible foodstuff 101 for example, causes the  
17 audio frequency to change proportionately. Figure 4 is a block  
18 diagram which illustrates how a changing ohmic value when  
19 presented to the sense terminals may be used to control the  
20 musical pitch or frequency of a voltage controlled oscillator  
21 132. Once again, sense terminals are the user's tongue 102 and  
22 edible foodstuff 101 whereby the varying ohmic value is  
23 controlled by tongue or mouth pressure, degree of contact to



1 edible foodstuff 101 and other means as described elsewhere in  
2 this text.

3

4 3. An audio frequency tone which volume is proportional  
5 to the current or capacitance in the circuit is generated.

6

7 4. A series of audio frequency tones or notes is  
8 generated in response to contact of the edible foodstuff by the  
9 tongue, mouth or other body member. A song, rhythm or other  
10 musical piece could be produced by the device whereby this  
11 action is initiated for example by contact of the user's tongue  
12 to the foodstuff.

13

14 5. A prerecorded sound is replayed in response to  
15 contact of the edible foodstuff by a body member. This  
16 prerecorded sound may be permanently stored in a memory device  
17 which is programmed during device manufacture. Figure 5 is a  
18 block diagram which shows how a sound generator with  
19 prerecorded audio may be triggered and or controlled by the  
20 ohmic value presented to the sense terminals. Again, sense  
21 terminals are the user's tongue 102 and edible foodstuff 101.  
22 Alternately, the sound to be generated may be recorded by the  
23 user at some time prior to playback. For example, a personal

1 message could be recorded in such a device by an individual  
2 with the intent that it be replayed by another individual.  
3 Figure 6 is a block diagram of an audio record and playback  
4 means whereby at least the playback is triggered and or  
5 controlled by presenting an ohmic value to the sense terminals  
6 as previously described.

7 A particularly interesting device would be one which  
8 employed a prerecorded animal sound which correlated with the  
9 shape and design of the foodstuff. For example, a piece of  
10 taffy in the shape of a frog could emit a loud "ribbet" when  
11 licked or otherwise contacted. Likewise, a "space alien" could  
12 emit a cry when its head, arms or other extremities were bitten  
13 off. Figure 7 shows how an electrically conductive edible  
14 figure 107 may be coupled to holder 100 in one embodiment of  
15 the instant invention.

16 Young boys seem particularly attracted to rather grotesque  
17 themes such as the aforementioned. Indeed, each extremity of  
18 the creature could have a unique resistance value or contact  
19 connection and hence a unique sound associated with it. A game  
20 such as "hangman" could be played whereby portions of the  
21 creature are successively eaten until the creature is  
22 completely consumed. The user's actions may be prompted by  
23 sounds produced by the instant invention.

1           A fire engine siren sound could be generated each time the  
2   user's tongue touched a piece of "hot" cinnamon candy. Devices  
3   holding candy containing sour tasting ingredients such as malic  
4   acid might produce a "yecchh!" sound each time the candy  
5   element was contacted to the user's tongue.

6  
7           6.    A game sequence which may take, for example, the form  
8   of user input consisting of multiple and or repeated tongue  
9   contact with the foodstuff in response to sounds and or lights  
10   emitted from the electronic circuit. One version of such a  
11   game is commonly known as "memory." In this game the  
12   electronic circuit emits a series of notes or tones. The user  
13   must thereafter repeat this series of notes or tones. Proper  
14   repetition of the notes or tones is rewarded when the device  
15   repeats and then adds to the series, thereby presenting a new  
16   challenge to the user. Improper repetition is announced by an  
17   unpleasant tone often referred to as a "raspberry." LED's or  
18   or other lighting means could be employed to provide feedback  
19   to the user in conjunction with or apart from sounds generated  
20   by the device.

21           Another game which could be employed would be a teaching  
22   game whereby the device emits tones or beeps or flashes of  
23   light corresponding to numerical values and a mathematical

1 operator. The user then must respond by providing the proper  
2 solution to the mathematical problem. A reward and punishment  
3 scheme similar to that described above could also be used with  
4 this type of game with the reward being, for example, a brief  
5 musical tune. The user could select predetermined operators if  
6 desired to eliminate the need for the device to produce them.  
7 In such a scheme if an "addition" operator was chosen, the  
8 following sequence might occur:

9 Device: "beep-beep" "beep-beep" (what is  $2 + 2$ ?)

10 User: Lick, Lick, Lick, Lick (4)

11 Device: (plays a musical tune and presents a new  
12 problem to be solved)

13 Pre-selection of the mathematical operator or, indeed, the  
14 nature of the game to be played could be selected by user input  
15 in the form of a series of contacts with the foodstuff or by  
16 means of a conventional, manually operated switch(s). A small  
17 microcontroller driving a speaker could perform the functions  
18 discussed above with the single user input being tongue contact  
19 to the conductive foodstuff. The rate of tongue contact, the  
20 position of tongue contact on the foodstuff, force with which  
21 the tongue contacts the foodstuff or surface area contacted, or  
22 a combination of these could serve to provide feedback to the  
23 microcontroller and hence, user inputs to the game.

1           7.    Another version of the device, as shown in Figure 6,  
2   employs a microphone 132' to monitor sounds and/or vibration  
3   transmitted through the foodstuff when licked, bitten or  
4   chewed.    This sound is amplified and played through a  
5   loudspeaker.   A system with this feature would provide  
6   amusement each time the foodstuff was licked, bitten or chewed.  
7   The microphone 132' and loudspeaker 132 could be combined in  
8   one device with a switching means to first record and then  
9   alternately playback sounds.   Sounds produced may include a  
10   loud or exaggerated licking or slurping noise which may include  
11   playback of the recorded sound with deliberate distortion  
12   and/or amplification.

13  
14           It is understood that variations in the electrical  
15   resistance of the current path particular to the food stuff may  
16   be due to any combination of the following:

- 17           1.    Specific conductivity of the foodstuff;  
18           2.    Moisture present in the foodstuff or on the surface  
19   of the foodstuff;  
20           3.    Tongue, mouth, or other body member contact point  
21   location on the foodstuff, relative to the current path;

1           4.     Surface area contacted by the body member either on  
2     the edible foodstuff and/or the at least partially conductive  
3     holder;

4           5.     Force of contact between the edible foodstuff and the  
5     body member and/or force of contact between the at least  
6     partially conductive holder and a body member;

7           6.     Alterations in the geometry of the edible foodstuff  
8     such as stretching or compressing the foodstuff so that the  
9     conductive cross section of the current path is altered or, by  
10    changes in the foodstuff geometry by removing portions of the  
11    foodstuff through such actions as biting and/or tearing with  
12    the teeth or fingers; and

13          7.     Alterations in the geometry of the edible foodstuff  
14    such as stretching or compressing the foodstuff so that the  
15    conductivity of the foodstuff is altered by compression or  
16    expansion of the foodstuff or otherwise changing its structure.

17                 Similarly, versions of this device which are controlled by  
18    variations in electrical capacitance rather than resistance may  
19    employ any of the well known means of changing the effective  
20    capacitance of the circuit to produce the same effects. Such  
21    means include varying one or more of the following parameters:

22                 dielectric constant, surface area, distance between  
23                 conductive elements.

1 Foodstuffs anticipated for use with the device include,  
2 but are not limited to the following:

3 Taffy, chewing gum, licorice, fudge, cotton candy,  
4 marshmallow, caramel, "gummy candies" (gelatin based  
5 candies such as "Gummy Bears" manufactured by  
6 Heide, Henry, Inc. New Brunswick, NJ), hard candies  
7 (which may contain various sugars and/or corn  
8 syrup), fondants, breads, cakes, cookies, crackers,  
9 cheeses, vegetables (such as carrots and the like),  
10 fruits, jerked meats, or frozen confections such as  
11 ice cream and juice bars.

12  
13 Incorporation into the foodstuff of air or other  
14 relatively poor electrical conductors may be employed to reduce  
15 and/or control the electrical conductivity or dielectric  
16 constant of the foodstuff. Likewise, water or ionizing agents  
17 may be dispersed or dissolved into the foodstuff to alter the  
18 electrical conductivity or dielectric constant of the  
19 foodstuff.

20 A listing of measured resistance values for various  
21 confectionery items is shown in Table 1.

22 The electrical property of the foodstuff used to trigger  
23 and/or control the action generating means need not be

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1 uniaxially constant or even constant in the same axis with  
2 respect to location along that axis. For example, a  
3 combination of differing types of foodstuffs may be combined by  
4 layering, partial kneading, folding, or extrusion which  
5 produces a mass which has differing electrical properties  
6 depending on the orientation of current flow or electrostatic  
7 potential.

8 Figure 8 shows how nonhomogeneous foodstuffs 108, that is  
9 foodstuffs with differing electrical properties, may be  
10 combined to create circuits which exhibit a non-linear  
11 conductivity function with respect to point of contact. Such  
12 nonhomogeneous foodstuffs 108 could exhibit a non-linear change  
13 in either electrical conductivity or electrical capacitance  
14 with a linear change in point of contact. Indeed, foodstuffs  
15 120,130 exhibiting differing electrical properties could be  
16 suspended in one another. For example, spheroids of highly  
17 conductive candy may be suspended in a candy of relatively  
18 lower conductivity. When a user contacts the more highly  
19 conductive portions of the candy matrix a non-linear change in  
20 resistance with respect to the position of the user's tongue on  
21 the candy will be realized.

22 Figure 9 illustrates how for example, a more conductive  
23 foodstuff element 120 could be alternately stacked with a less



1     conductive foodstuff element 130.     This would yield a  
2     "potentiometer" which could generate a resistance "step"  
3     function with respect to linear changes in the contact point of  
4     current flow. If a voltage controlled oscillator 132 (VCO) was  
5     connected to a power source 134 placed in series with this  
6     stack of foodstuffs (candy, for example) an "electronic  
7     harmonica" is created whereby relative position of the user's  
8     tongue causes discrete, predetermined notes to be played. When  
9     coupled with the holder base 100 described above whereby  
10    portions of the user's body 102,104 become part of the  
11    electrical circuit, a practical, edible, electronic musical  
12    instrument is created.

13           A further variation on the instant invention includes a  
14    foodstuff 101 which may be combined with an electronic circuit  
15    103 to product the effects described previously whereby only a  
16    very small portion of the user's body becomes part of the  
17    circuit. For example, the harmonica 200 in Figure 10 may  
18    present two adjacent contacts to the user's tongue or lips 102.  
19    When the circuit between these two contacts is completed via  
20    the user's tongue or lips, a musical note is produced. Several  
21    sets of contacts may be employed in like fashion to produce a  
22    harmonic scale of musical notes. A first edible foodstuff  
23    array 201 and a second edible foodstuff array 202 may be

1 positioned relative to each other so that when corresponding  
2 elements of these arrays are connected via contact with the  
3 user's mouth or tongue 102, a note specific to these elements  
4 is generated. In a device such as a harmonica 200, the holder  
5 100 need not necessarily be electrically conductive.

6 A still further variation of this device utilizes a  
7 plurality of edible elements 110 connected to various sites on  
8 the holder in such a fashion that they do not communicate  
9 electrically with one another. Each holder site produces a  
10 different response when its circuit is completed. For example,  
11 Figure 11 shows how eight isolated foodstuff elements 110 may  
12 be positioned, each in contact with one of eight electrical  
13 inputs which are connected to an electrical sound generation  
14 device 132. Touching each element 110 produces a unique sound  
15 or action regardless of how or where the candy piece is  
16 touched. Such a system is included in the scope of the instant  
17 invention.

18 Additionally, a single piece of candy 101 may be connected  
19 to a single electrical contact with various sound selections  
20 being made by finger contact on a plurality of electrically  
21 conductive regions (or push button switches) on the holder 100.  
22 Sound generation would not commence until the user's tongue 102  
23 contacted the single piece of candy, thereby completing the

1 circuit. Musical note selection would be similar to that of a  
2 flute whereby fingering position selects the note to be played  
3 and contact with the tongue or mouth 102 serves to switch on  
4 the note.

5 Another variation of the device would have the foodstuff  
6 111 take the form, for example, of a solid of revolution  
7 resembling a high voltage electrical insulator. Irregularly  
8 surfaced foodstuff element 111, as illustrated in Figure 12,  
9 would permit the user to run his tongue 102 across the surface  
10 of the foodstuff thereby making and breaking contact with the  
11 foodstuff. This would permit a rapid succession of changing  
12 electrical inputs to be created by the user which could produce  
13 unusual and interesting sound and/or lighting effects. A  
14 similar input means could be created by twisting or otherwise  
15 forming together (as when producing a striped candy cane) a  
16 plurality of foodstuffs 120,130 with differing electrical  
17 properties.

18 Again referring to Figure 13, the device output may also  
19 be altered in response to variable optical input. An alternate  
20 embodiment of the instant invention uses varying levels of  
21 light which may be transmitted through the foodstuff or  
22 proximal to the foodstuff to a light controlled oscillator or  
23 other electronic system. With a light controlled oscillator

1 for example, the user may control the pitch of the oscillator  
2 by the relative position of the foodstuff to the mouth. A  
3 musical tune may even be played by carefully controlling  
4 relative position of the mouth and the foodstuff. The source  
5 of light for this device may be derived from natural ambient  
6 light or may come from an artificial source such as a room lamp  
7 or even from a light source which is integral to the foodstuff  
8 holder. Said light source may consist of visible light,  
9 invisible(e.g. infrared or electromagnetic) light, or a  
10 combination of visible and invisible light. Any of the  
11 previously mentioned effects or games may be triggered and or  
12 controlled by this optical means.

13  
14 It is understood that variations in the level of light  
15 reaching the photo sensor may be due to any combination of the  
16 following situations:

17 1. Light transmittance at a given wavelength of the  
18 lollipop 301;

19 2. Inclusion of entrained air bubbles, particles or  
20 other objects which may contribute to a nonhomogeneous nature  
21 of the lollipop 301;

22 3. Contact point location on the foodstuff 301, for  
23 example, tongue or mouth 102 position on the foodstuff and

1 hence blockage of some or all of the light otherwise received  
2 by the photo sensor or alternately, degree of obscuration of  
3 light reaching the photo sensor due at least in part to the  
4 degree of coverage of the foodstuff or photo sensor proximal to  
5 the foodstuff by the user's mouth, tongue or other body part or  
6 other object;

7 4. Portion of lollipop 301 shielded from light by user's  
8 mouth or tongue 102, other body part 104, or other object;

9 5. Level of light available to which the foodstuff 301  
10 is exposed;

11 6. Alterations in the geometry of the edible foodstuff  
12 such as stretching or compressing the foodstuff 301 so that its  
13 optical transmission properties are altered or by changes in  
14 the foodstuff geometry through removal of portions of the  
15 foodstuff by such actions as biting and/or tearing with the  
16 teeth or fingers; and

17 7. Alterations in the geometry of the edible foodstuff  
18 such as stretching or compressing the foodstuff so that the  
19 optical properties of the foodstuff are altered by compression  
20 or expansion of the foodstuff or otherwise changing its  
21 structure.

22 In the preferred embodiment of the present invention,  
23 shown in Figure 13, the means of control relies on varying

1 levels of light through or proximal to a candy element. A  
2 candy holder with optical control 300 holds a lollipop 301.  
3 Lollipop stick 302 may be gripped or otherwise held by stick  
4 receiver 303. Stick receiver 303 may optionally be in the form  
5 of a tube designed in such a manner so as to receive lollipop  
6 sticks of varying diameters and lengths. Stick receiver 303  
7 may be designed with a slight curve so that an interference fit  
8 is created between the sides of stick receiver 303 and lollipop  
9 stick 302. Included electronics 304 comprises sound, light or  
10 other action generating means as may be desired. The  
11 embodiment of the instant invention as illustrated in Figure 13  
12 employs a solid state electronic oscillator to create sound.  
13 The included electronics 304 are powered by battery 305.  
14 Electrical output from the electronics 304 is electrically  
15 connected to loudspeaker 306. A push button switch 307 turns  
16 the device on and off as desired. The electronic oscillator is  
17 of a variable frequency type which frequency is controlled by  
18 photo sensor 308. Photo sensor 308 is exposed to varying  
19 levels of light through optical window 309 which is in optical  
20 communication with optical passage 311. Optical window 309  
21 serves not only to permit the passage of light but also to  
22 prevent spittle from contacting photo sensor 308 or from  
23 entering housing 312. A light shield 310 prevents stray light

1 from reaching photo sensor 308 and thereby interfering with the  
2 desirable control of the device. Light shield 310 is  
3 preferably opaque to light so as to minimize this stray light.  
4 Any significant levels of light then must necessarily pass  
5 through the candy element of lollipop 301 and then through  
6 optical passage 311 and optical window 309 before reaching  
7 photo sensor 308. It is assumed that stray light must also be  
8 prevented from entering optical window 309 or photo sensor 308  
9 from the sides or those faces which are not oriented toward  
10 lollipop 301. This may conveniently be achieved by making  
11 housing 312 of an opaque or nearly opaque material and insuring  
12 that any joints or seams are tight. Overlapping "lips" such as  
13 are common in the construction of mating halves of injection  
14 molded plastic housings can achieve this light tightness.  
15 Optionally, stick receiver 303 may be extended out through the  
16 bottom of housing 312 so that in the event that lollipop stick  
17 302 becomes stuck in stick receiver 303 such as in the event  
18 that all of the lollipop 301 has been consumed, that an item  
19 similar to lollipop stick 302 may be used to push lollipop  
20 stick 302 out of stick receiver 303 so that the device may be  
21 reused with a new candy element. Any manner of candy element  
22 may be used with this embodiment of the instant invention so  
23 long as the candy element will permit light to pass through it

1 and to photo sensor 308. Alternately an opaque candy element  
2 may be used when, photo sensor 308 is positioned in such a  
3 fashion that it is proximal to the candy element and situated  
4 in such a manner so that it is exposed to levels of light  
5 proximal to the candy element. In this arrangement the levels  
6 of light reaching photo sensor 308 are more or less congruent  
7 with those to which the candy element is exposed and more  
8 importantly, those levels of light which vary in proportion to  
9 the position of the user's mouth or tongue relative to photo  
10 sensor 308 as user's tongue or mouth acts upon the candy  
11 element thereby creating the desired effect of control of the  
12 action generating means by the relative position of one's  
13 mouth, tongue, or other body member to the candy element.

14 The candy holder with optical control 300 then, functions  
15 in the following manner:

16 Light passes through lollipop 301 and through optical  
17 passage 311 and further through optical window 309. Said light  
18 then reaches photo sensor 308 (which may be of the cadmium  
19 sulfide type) whereby it affects the ohmic value of photo  
20 sensor 308. Photo sensor 308 is operatively coupled to a  
21 variable frequency audio oscillator circuit which frequency is  
22 controlled by the ohmic value of photo sensor 308 and therefore  
23 is responsive to the level of light falling on photo sensor



1 308. One such possible circuit is illustrated in Figure 14.  
2 The electrical output of the variable frequency oscillator is  
3 connected to loudspeaker 306 whereupon the electrical signal  
4 is converted to sound. The variable frequency oscillator may  
5 be designed such that a decrease in light falling on photo  
6 sensor 308 causes a corresponding decrease in the audio  
7 frequency or musical pitch of the oscillator. Since the  
8 frequency of the oscillator is proportional to the level of  
9 ambient light passing through lollipop 301 and since this level  
10 of light may be more or less controlled by the degree with  
11 which one's mouth covers lollipop 301 it is evident that the  
12 musical pitch produced by candy holder with optical control 300  
13 may be controlled by one's mouth in such a manner that musical  
14 notes and indeed, even songs may be played. Duration of sound  
15 output is controlled by holding down push button switch 307.  
16 It is relatively easy to play simple tunes on the instant  
17 invention and with a bit of practice even rather involved  
18 musical pieces may be performed.

19 Figures 14, 15, and 16 illustrate circuits which may be  
20 employed to control the generation of sound by means of varying  
21 the light level transmitted through or proximal to an edible  
22 foodstuff. These circuits are illustrative only and it is

1 understood that it is within the scope of this invention to  
2 include other specific means to achieve the desired effects.

3 Yet another embodiment of this invention includes means  
4 for providing an "electrical sensation" to the user's tongue,  
5 mouth or other body member from the device by means of  
6 producing a mild electrical shock which may be transmitted  
7 through the foodstuff. The electrical stimulation may also be  
8 used to alter sense of taste and thereby, the apparent flavor  
9 of the foodstuff.

10 In situations where the properties of the foodstuff make  
11 it difficult or impractical to rely on the electrical  
12 resistance, capacitance or optical properties of the foodstuff  
13 for action controlling means, a small switch or transducer 136  
14 may be situated in the holder which is operatively coupled with  
15 the foodstuff and is responsive to forces applied to it by the  
16 foodstuff. This transducer may be a simple on-off switch or  
17 take the form of a "joystick" with a plurality of variable  
18 outputs.

19 Any of the above mentioned devices that create a response  
20 to user input could be equipped with a means to disable said  
21 response as may be desired.

22 Since in many cases the cost of the foodstuff holder 100  
23 may be of relatively high cost as compared to the foodstuff

1 101, it may be desirable to make the holder reusable so that  
2 the foodstuff may be replaced once the original is consumed.  
3 Any of several means may be employed to temporarily but  
4 securely hold the foodstuff 101 in place in the holder 100.

5 In the case of candies as foodstuffs 101, it may be  
6 desirable to have the socket/contact be designed such that any  
7 of several "off the shelf" candies may be inserted into the  
8 holding socket 140. This feature permits the user to readily  
9 obtain refill foodstuff elements 101 at a variety of locations  
10 and offers additional variety over a single, dedicated-  
11 foodstuff design.

12 The instant invention therefore, teaches of a new and  
13 highly interesting device which makes advantageous use of  
14 optical, electrical or other physical conditions of a secured  
15 foodstuff to control an incorporated action generating means.  
16 Which means includes but are not limited to sound, light,  
17 movement, vibration, electrical stimulation and odor  
18 generation.

19 Although the invention has been described in terms of  
20 specific embodiments, it will be readily apparent to those  
21 skilled in this art that various modifications, rearrangements  
22 and substitutions can be made without departing from the spirit  
23 of the invention. It is understood that the means of producing

1 the instant invention include but are not limited to the  
2 specific materials and embodiments described herein and that  
3 other means exist to meet the requirements of such a system.  
4 Such additional means are within the scope of this patent. The  
5 scope of the invention is defined by the claims appended  
6 hereto.